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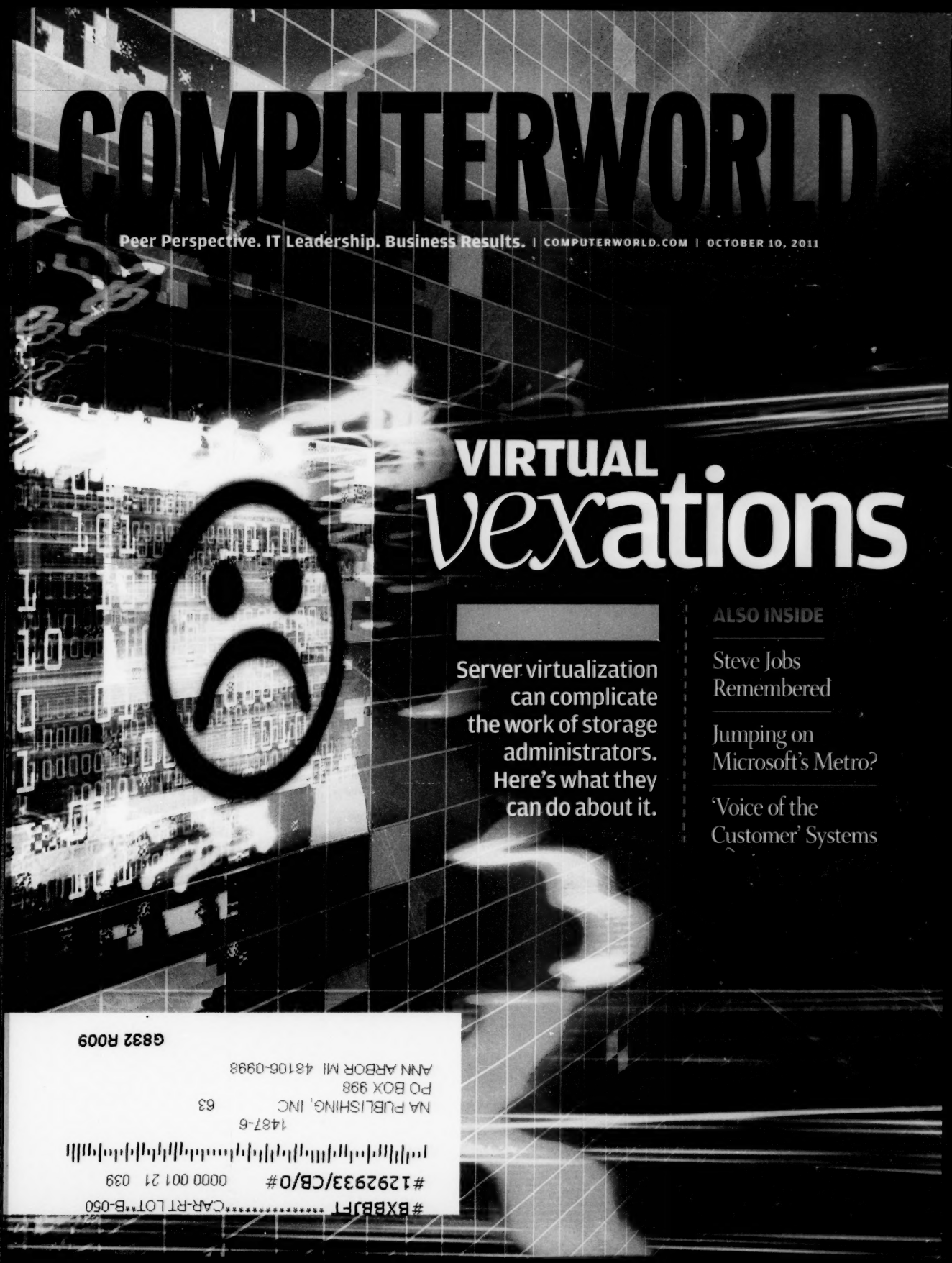

VIRTUAL *vex*ations

Server virtualization can complicate the work of storage administrators. Here's what they can do about it.

ALSO INSIDE

Steve Jobs Remembered

Jumping on Microsoft's Metro?

'Voice of the Customer' Systems

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COVER STORY

Virtual Vexations

16 Server virtualization can complicate a storage administrator's job. Here's a look at five common headaches – and what you can do about them.

Extreme Storage

26 Big institutions like the Library of Congress take innovative approaches to dealing with the challenge of storing massive amounts of data.

Listening to the Voice of the Customer

28 Consumers have an ever-expanding number of ways to tell you what they think, so it's imperative to take an organized approach to collecting, storing and analyzing their feedback.

HEADS UP | **2** BI helps the **Pittsburgh Pirates** fill seats. | New flaws are found in **SCADA** systems. | **4** Bloomberg rails against the **H-1B visa cap.** | **OpenStack** gets an upgrade.

NEWS ANALYSIS
6 Apple rivals and IT gurus remember **Steve Jobs** and reflect on his lasting impact. | **8** Users hope for stability at HP with **Meg Whitman's** appointment as CEO.

OPINIONS | **14** **Steven J. Vaughan-Nichols** checks out Windows 8 and its Metro interface and sees a Vista-like train wreck. | **35** **Preston Gralla** pans Metro as well, saying enterprises aren't likely to get on board. | **40** Details are at the root of IT-business disconnects, says **Paul Glen.**

DEPARTMENTS
10 **The Grill:** Save the Children CIO Ken Murdoch | **34** **Security Manager's Journal:** Getting the Most Out of SIEM | **36** **Career Watch** | **39** **Shark Tank**

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Fresh Insights
New Trends
Great Ideas

HeadsUp

DAVE ARRIGO / PITTSBURGH PIRATES

The Pirates are using predictive analytics to sell tickets to home games at PNC Park.

BUSINESS INTELLIGENCE

Pirates Tap BI to Boost Attendance

AFTER 19 CONSECUTIVE losing seasons, the Pittsburgh Pirates needed an assist to fill the nearly 40,000 seats in their home field, PNC Park.

So the team turned to predictive analytics to identify customer trends that could help it retain season ticket holders and attract new ones. The tools, from SAS Institute, help predict which fans would likely renew or buy season tickets by analyzing their feelings about the team, previous purchase patterns and social media interactions, among other factors.

Jim Alexander, the Pirates' senior director of business analytics, said the goal is to give the club's sales and marketing personnel information that can be used as the basis of targeted promotions and advertising campaigns. "We interact with fans in several ways," he said, and the business intelligence tools help analyze data from multiple sources.

The Pirates are among a growing number of organizations that are using predictive analytics to improve operational efficiencies and find new ways of generating revenue.

Rita Sallam, a Gartner analyst, said that around 10% of enterprises are successfully using predictive analytics to drive strategic benefits. "This is an area where there will be major growth as long as we can overcome the skills gap and ease-of-use gap" that has historically stunted the adoption of predictive-modeling tools, she said.

– Jaikumar Vijayan

SECURITY

Zero-Day Flaws Discovered in SCADA Systems

An Italian security researcher recently disclosed details about several zero-day vulnerabilities in supervisory control and data acquisition (SCADA) systems from several vendors.

The discovery – the second such disclosure by researcher Luigi Auriemma this year – is likely to reinforce concerns about weaknesses in the nation's critical infrastructure.

The most recent vulnerabilities affect SCADA products from Rockwell Automation, Cogent DataHub, Measuresoft and Progea, among other vendors.

Most of the vulnerabilities are remote code execution flaws that allow attackers to run code on the systems, and some of the flaws are easy to exploit, Auriemma said. At least three of the vendors have already issued fixes, and Rockwell is working on one, he said.

SCADA systems are used to control critical equipment at power plants, manufacturing facilities, water treatment plants and elsewhere. Security analysts fear that attacks against such systems could cripple critical infrastructure, including the electric grid and water supplies.

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The Stuxnet worm, which exploited a weakness in a Siemens control system to disrupt operations at an Iranian nuclear power plant, is often cited as an example of the kind of threat that can be unleashed upon vulnerable SCADA systems.

– JAIKUMAR VIJAYAN

TOUGH QUESTION #18

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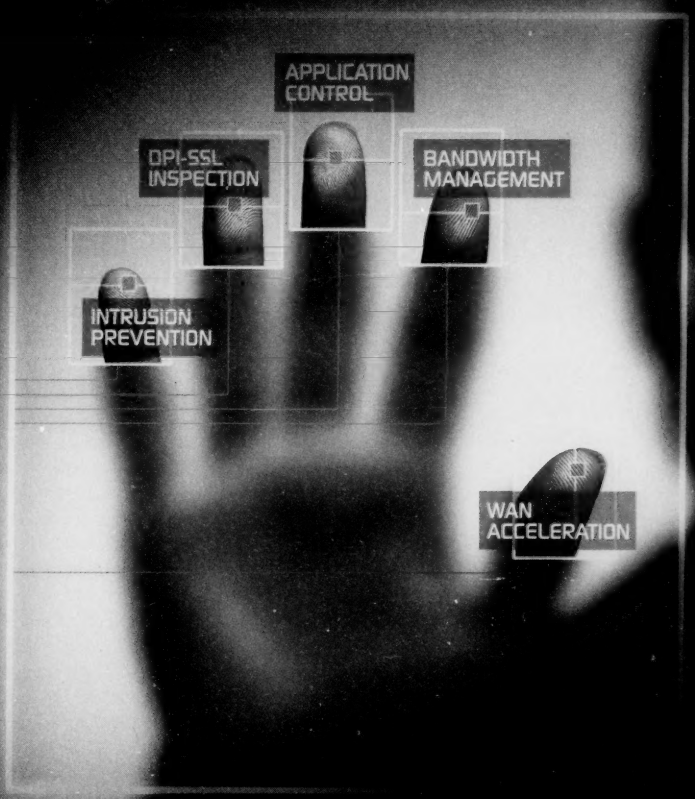

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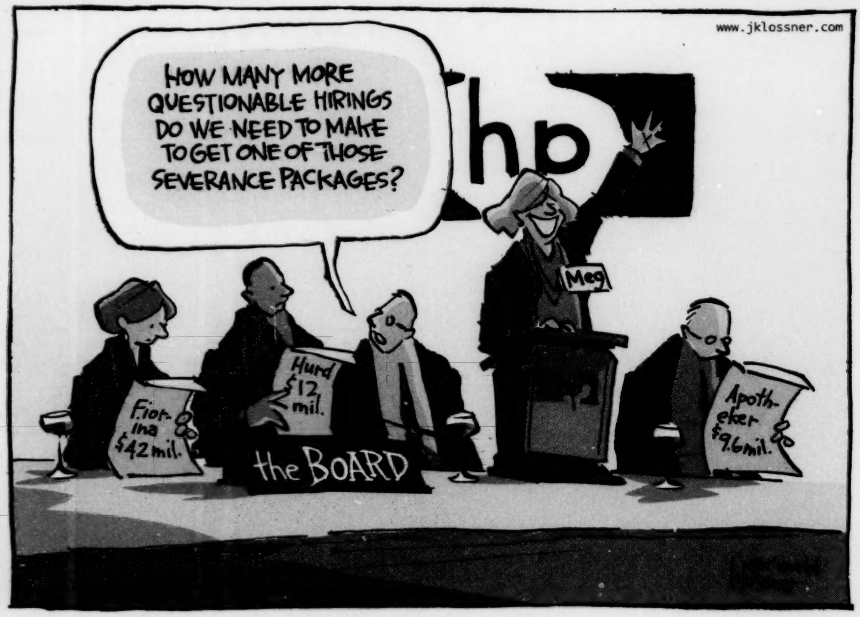
By John Klossner



CAREERS

H-1B Visa Cap Must Go, Says NYC Mayor

NEW YORK MAYOR Michael Bloomberg is calling for "eliminating the cap on H-1B visas" because restrictive U.S. visa policies — particularly limitations on employment-based green cards — are a form of "national suicide."

In a speech late last month at the U.S. Chamber of Commerce offices in Washington, Bloomberg said that "temporary visas like the H-1B program help fill critical gaps in our workforce, but the numbers are too few and the filing process too long and unpredictable."

Bloomberg has long called for eliminating the visa cap to ease access to employment-based green cards. He's also an advocate of altering visa policies to attract foreign entrepreneurs and encourage foreign students to stay in the U.S.

His latest comments come at a time when demand for H-1B visas is relatively light — as is IT hiring overall. Before the recession, all available year-long visas were snapped up in a week.

In his speech, Bloomberg didn't address arguments from H-1B opponents, who view the visa as a way for companies to bring in low-cost employees or displace U.S.-based workers through offshore outsourcing.

Instead, he said that foreign workers are critical to U.S. economic success.

Bloomberg contended that the rapid exhaustion of H-1B visas in the early 2000s caused "critical shortfalls" in the software industry and in fields like engineering, electronics, pharmaceuticals, medical research and aerospace. "[It's] absurd to deny American companies access to the workers they need," he said.

Just prior to the start of the U.S. government's 2012 fiscal year on Oct. 1, U.S. Citizenship and Immigration Services had received 48,900 petitions for H-1B visas — representing about 57% of the 85,000 visas available for 2012.

The downturn in demand is tied to the economy, said Vic Goel, an immigration attorney. It shows that visa usage "does ebb and flow with the state of the economy," which helps to make the case for less restrictive policies, he added.

– Patrick Thibodeau

Micro Burst

Despite global economic woes, U.S. corporate IT spending rose

6%

in the second quarter, according to the Bureau of Economic Analysis.

OPEN SOURCE

OpenStack Eyes 'Extreme Scale' In Upgrade

OpenStack developers have updated the project's open-source cloud software with a new graphical interface and a unified authentication-management system.

One goal behind the update is to "make OpenStack easier to use and administer," said Jonathan Bryce, chairman of the OpenStack Project Policy Board. "And we've continued to improve for extreme scale" to enable OpenStack to accommodate "tens of thousands" of servers, he added, noting that "other options out there aren't really considering that scale."

Overall, this release – named Diablo – will include over 70 new features and enhancements, a number of which address the goal of massive scalability. A new distributed scheduler will deploy virtual machines anywhere in the system, and a new multicluster container sync feature can replicate data across different remote clusters. The image-management service now allows users to search for specific virtual machine instances.

Developed by NASA for its Nebula cloud project, OpenStack open-source software runs large cloud installations. So far, it has been downloaded over 50,000 times.

– JOAB JACKSON, IDG NEWS SERVICE

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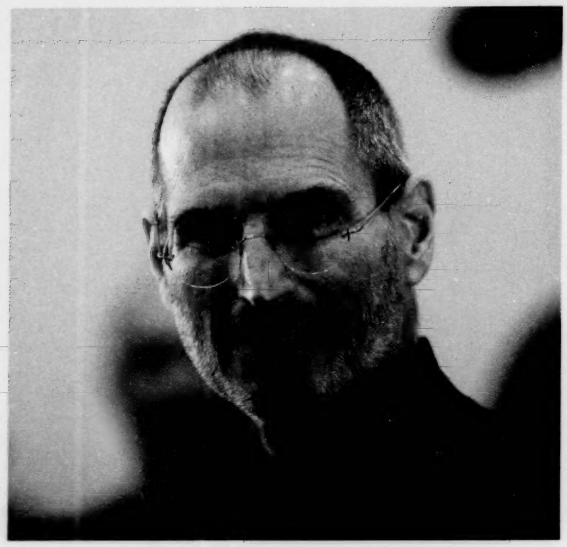
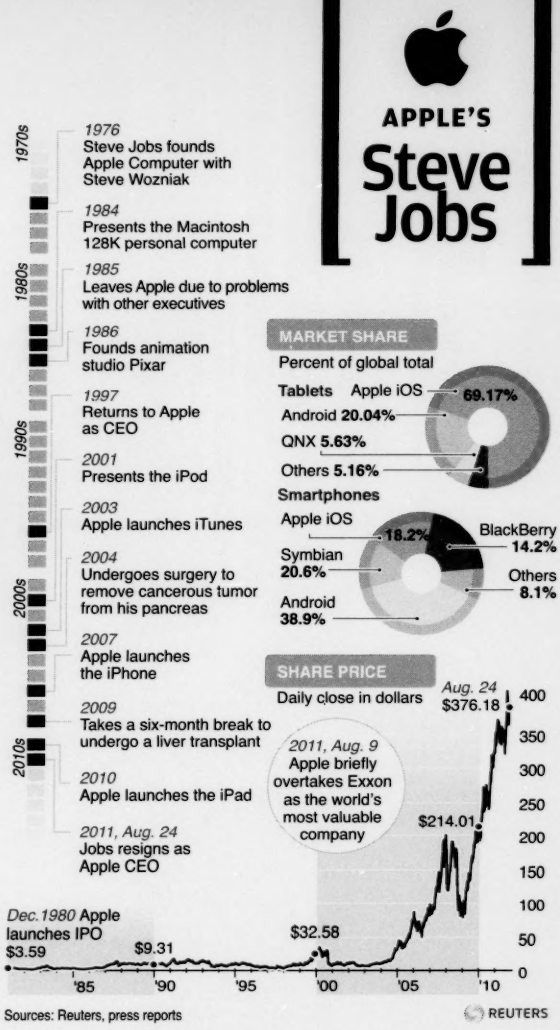


Steve Jobs Remembered

Rivals and IT gurus say the Apple co-founder and former CEO 'transformed' several industries. By Gregg Keizer and Agam Shah



THE DEATH of former Apple CEO Steve Jobs last week staggered longtime technologists of all stripes, giving them pause and reminding them of their passion for an industry that started in a garage.

"The world rarely sees someone who has had the profound impact Steve has had, the effects of which will be felt for many generations to come," said Microsoft co-founder and longtime rival Bill Gates, in a statement.

"Steve Jobs transformed four different industries: mobile phone, computing, content distribution and animation," said Gartner analyst Mark Hung. "Just as we're moving into a post-PC world that needs to integrate these disparate devices and content sources into a cohesive whole, he has unfortunately left us."

Jobs, 56, had been struggling with his health for years. In 2004, he underwent treatment for a rare form of pancreatic cancer. He returned to work soon afterward, but in 2009, he underwent a liver transplant. Early this year, he took a leave of absence to "focus on my health," as he put it, and on Aug. 24, he resigned as CEO.

He will be remembered as a visionary and a maverick — a sometimes cantankerous one — who pursued a doggedly independent path for Apple that could make it a frustrating place to work but that allowed it to make unique products.

In 1976, Jobs helped launch the PC business by building, with Steve Wozniak, the Apple I and co-founding Apple Computer, later renamed Apple. "There never was a [PC] industry without him," said Ezra Gottheil, an analyst at Technology Business Research.

Nine years later, Jobs was fired by John Sculley, the executive he recruited to succeed him as CEO. But he returned 11 years later to revive a financially strapped company.

When Jobs resigned in August, Apple was one of the most valuable companies in the world, with a stock market value of $350 billion. ◆

Shah *is a reporter for the IDG News Service.*

The world rarely sees someone who has had the profound impact Steve has had, the effects of which will be felt for many generations to come. CO-FOUNDER, MICROSOFT

REUTERS / ROBERT GALBRAITH

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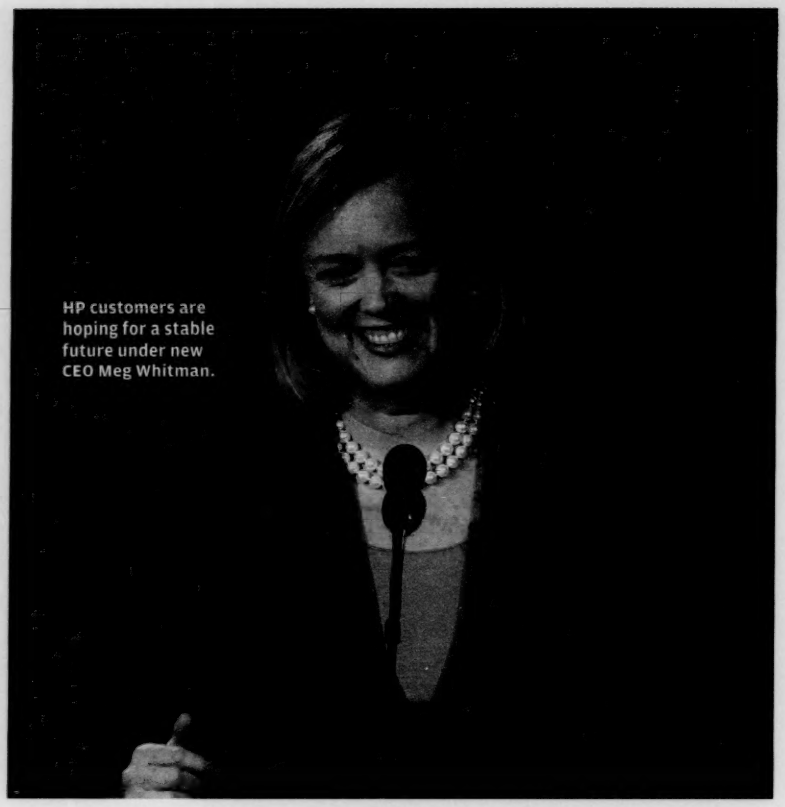

HP customers are hoping for a stable future under new CEO Meg Whitman.

Users Hope Whitman Can Bring Stability to HP

IT execs look to new CEO Meg Whitman to sort out the muddled product strategy that Leo Apotheker set forth in August. By Patrick Thibodeau and Agam Shah

HEWLETT-PACKARD CUSTOMERS who are disconcerted by the company's recent track record of management turmoil and product strategy shifts are hoping that new CEO Meg Whitman can bring some stability to the Silicon Valley icon.

The former eBay CEO was named to succeed Leo Apotheker late last month, shortly after his ouster from the helm at HP. Apotheker was fired less than a year after he succeeded Mark Hurd, who was dismissed amid a sexual harassment probe.

Ray Lane, executive chairman of HP's board, acknowledged that directors were "embarrassed" by the way Apotheker handled announcements in August that the company might sell or spin off its Personal Systems Group, planned to kill its line of WebOS smartphones and tablets, and had agreed to acquire software maker Autonomy for $10.2 billion.

> **[Whitman] has to figure out** in what businesses HP can be competitive and lay out a strategy.
>
> CIO, HUDBAY MINERALS

"I think the decision was poorly signaled," said Gerry McCartney, CIO at Purdue University, which uses HP servers, desktops and laptops. "When this was announced, it was unsettling. You wonder, 'What's coming next?' "

McCartney said he isn't rattled by management shake-ups, but noted that leaders shape a company's direction, which helps IT executives with product and vendor choices. He called on Whitman to communicate a five-year product plan so he can stabilize Purdue's internal IT road map.

"She has to figure out in what businesses HP can be competitive and lay out a strategy," said Joe AbiDaoud, CIO at metals mining company HudBay Minerals. HP's current strategy "is somewhat in flux," he said via email.

Gary Kern, CIO of MutualBank in Muncie, Ind., said that "HP needs something to revitalize how they look at their markets, and perhaps someone from a 'new media' type company [like eBay] could help with the thinking."

Speaking to financial analysts shortly after her appointment, Whitman said, "The only thing that will rebuild the confidence in this company is delivering results, and that's what I intend to do."

For 10 years, Whitman transformed eBay from a small online auction company to a worldwide brand. In 2008, she moved on to pursue a bigger ambition: to become governor of California. In 2010, she won the Republican nomination for governor but lost the election.

Clearly, Whitman has the credentials to be a corporate leader, but she will face close scrutiny in the months ahead as she tries to prove that she can move from running a consumer business to running an enterprise-focused IT vendor.

"Whitman brings her experience as a leader, no doubt," said N. Venkat Venkatraman, a professor of management at Boston University. "But her experience with enterprise is minimal at best." ◆

Shah *is a reporter for the IDG News Service.* **Chris Kanaracus** *of the IDG News Service contributed to this story.*

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THE Grill

Ken Murdoch

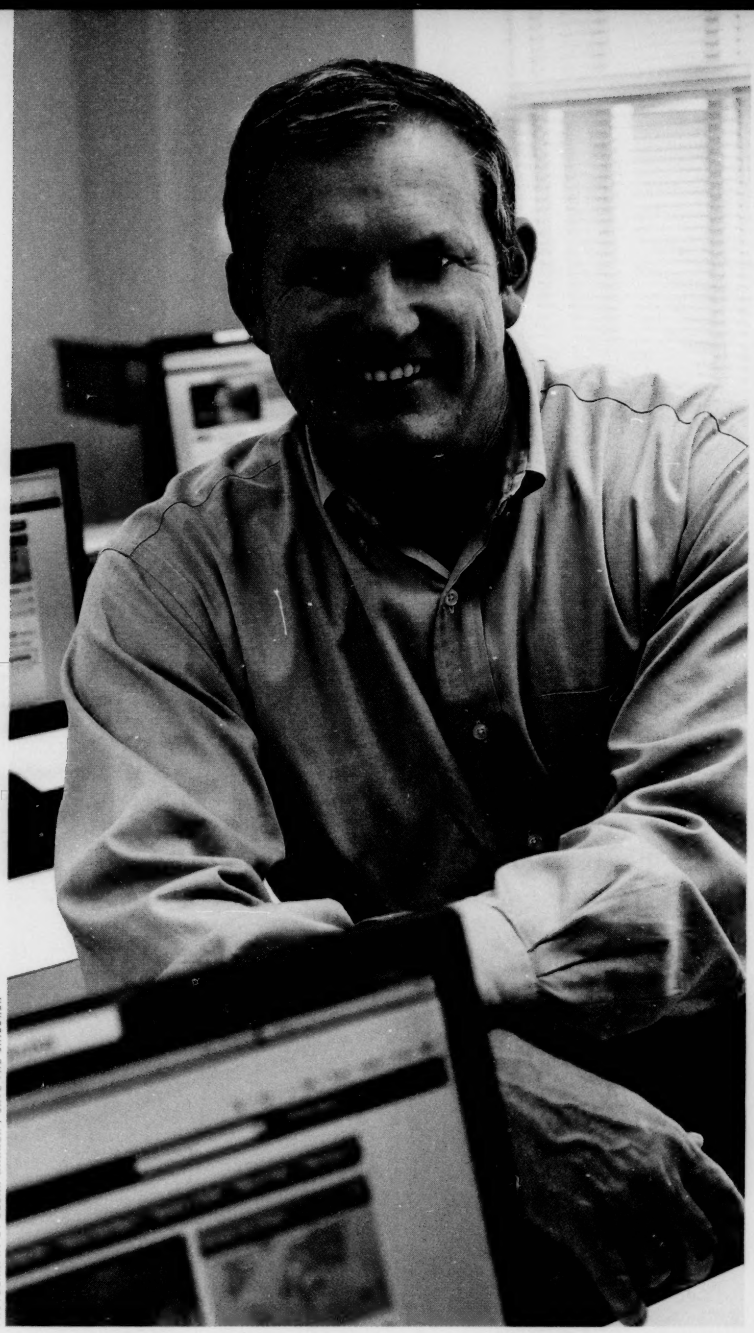
In crisis situations, this CIO helps deliver services to children, squeezing value out of every donation.

What do you do in your spare time? I try to spend as much time at home as possible. [Murdoch has been married for 29 years and has two grown children.]

Do you have any hobbies? Coaching baseball (summer semi-pro baseball at the college level) and football (at a private high school).

What's the best business book you've read? *It's Your Ship: Management Techniques from the Best Damn Ship in the Navy*, by Capt. D. Michael Abrashoff.

If you weren't in technology, what would you want to do for a career? This might sound kind of corny, but I'm doing it now. I'm working for good; I'm working for a cause.

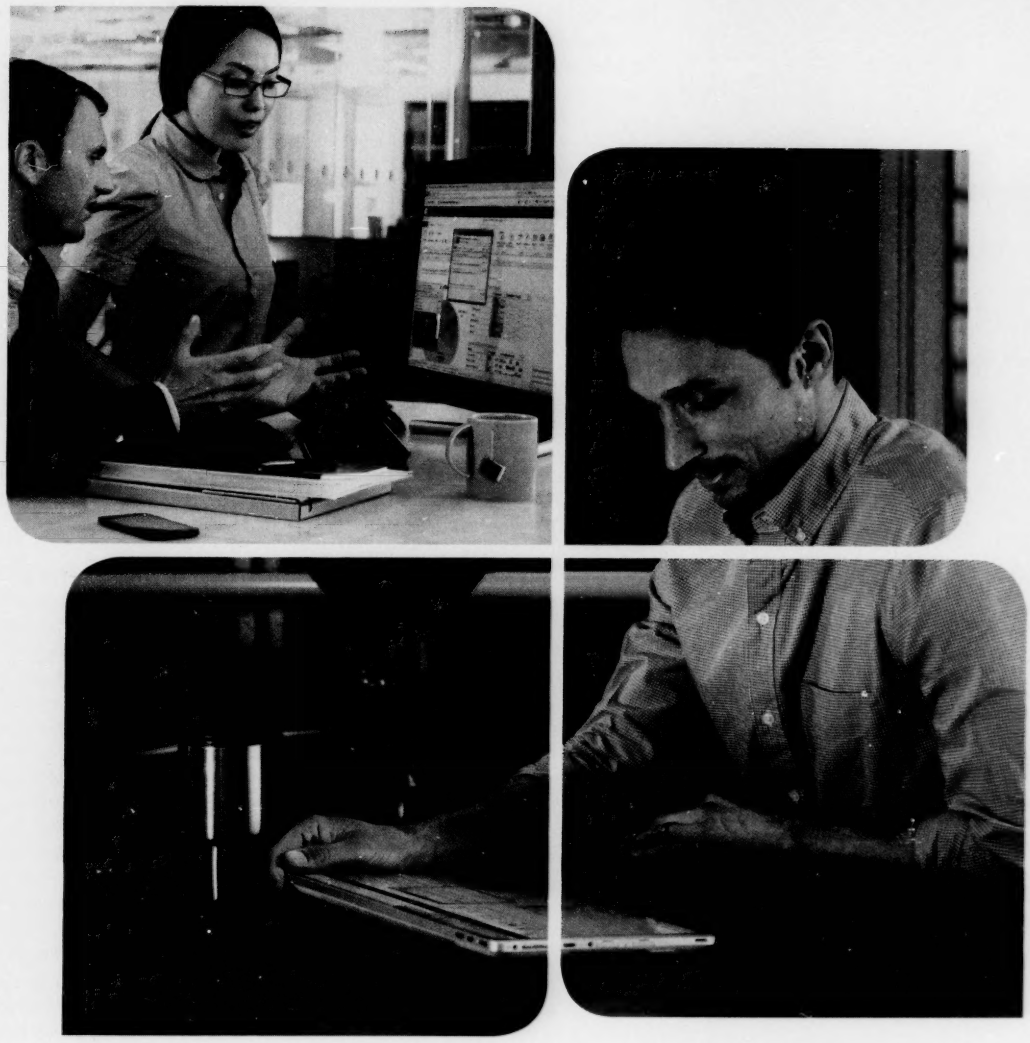


PHOTOGRAPHY BY SUSAN WARNER / SAVE THE CHILDREN

KEN MURDOCH'S *colleagues at the Save the Children Federation venture where few corporate workers go: war-torn countries, poverty-stricken regions and areas devastated by natural disasters. Yet this CIO's 30-member IT team must provide the same technologies that businesspeople in posh office buildings expect. Consider, for example, that Save the Children was one of the first nongovernmental organizations to have its networks restored and running following the catastrophic 2010 earthquake in Haiti. Murdoch's IT team made Skype operational again in less than 24 hours, allowing Save the Children officials to appear on news shows to provide information and appeal for aid, while the organization's remaining IT infrastructure was up in less than 72 hours. Murdoch credits his team for such successes. Here he discusses other aspects of leading Save the Children's IT operations.*

Continued on page 12

Microsoft



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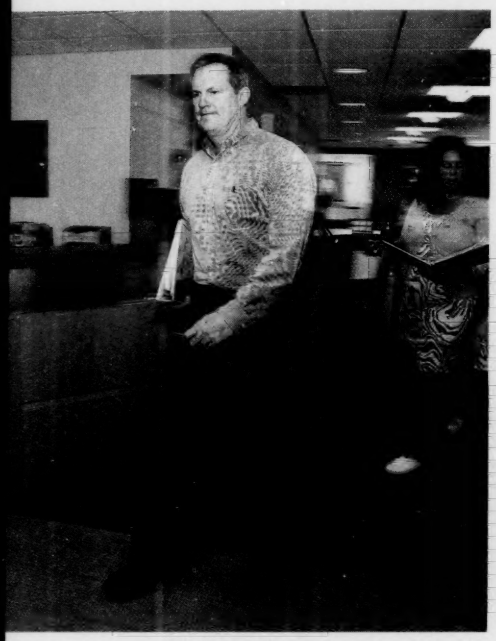

Continued from page 10

How does IT support the overall mission of your organization? Our IT team is very much an integral part of the overall mission of our agency. Our main focus here is to make sure that we give our business divisions the ability to cut down the time it takes to do things, have faster responses in emergencies, and do everything we can do to support the agency's goal of creating change for children.

Save the Children works in areas where many global companies won't operate. What are the challenges you face in serving the IT needs of your colleagues in such areas? The biggest challenge is [usually when] we walk into a situation where there's very little connectivity and limited commercial power. I was in Ethiopia a year ago visiting a school at one of our education programs, and in the classroom, you're working on daylight. There are few power sources, so there's limited computation capabilities, and that's just in the regular day-to-day and not even in the emergency response mode.

> **"The bottom line is: How do we provide technologies better, faster and cheaper,** so we can ... deliver on every dollar given to us?

What are the challenges of moving into areas following traumatic events? What are the key technologies that you rely on? In most cases, when the immediate infrastructure is disabled, we'll rely on satellite phones and BGAN units — that's satellite communications for voice and data — and Skype to enable the nimble and immediate communications we need. If I were to compare the situation in Japan to the one in Haiti [following the earthquakes in those countries], the approach was very different in each one. With Japan being such a technology-leading country, there were better and more available technologies to set up a quick response. But in Haiti, the infrastructure was a lot less mature, and we were forced to do more with satellite phones and satellite communications.

What can IT departments at for-profit organizations learn from your experiences? Having come from that sector — I spent 30 years in for-profit companies — a lot of the disaster recovery and disaster-recovery planning really focuses on servers being down, systems being unavailable — and not on natural disasters. So what I think they can learn from us is [to] be prepared for a natural disaster, have that as part of your planning. And that it comes down to people who are trained and willing and able to execute the plans. A trained and committed response team is key.

Which of the past decade's technology advances have made the most difference in supporting Save the Children's work? I would have to say the Internet. The Web, social media tools and SMS text have helped us to make the most difference in supporting what our organization does. The Web has enabled us to provide and receive the communication we need with our donors and sponsors, and the use of text messaging to donate via SMS has helped extend our reach demographically.

Looking ahead, what technologies hold significant promise for your organization? I see the continued use of social networking tools — the Web, Facebook, Twitter, YouTube, Flickr and Skype. They're places where you can reach vast numbers of donors. The other things are mobile devices, cell-powered devices and the ability to take photos and upload information as quickly as possible using those devices. The bottom line is that all these technologies help us build credibility. These technologies and the ability to appeal to broader constituencies help us to be a trusted agency. It's important because it helps us with fundraising and the ability to give credible information to donors and sponsors as to where our dollars are going.

Nonprofits are often judged on the amount of each dollar that goes toward its mission versus its overhead and operations. How does that influence your decisions as CIO and the IT department's objectives and operations? The percentage of revenue and ROI calculations are different. And there's a different way of managing IT. We make every effort to establish partnerships with the vendors to put the game-changing technologies in place and to reduce our implementation costs and provide us with reasonable and low-cost operator goals for ongoing run costs. People always forget the ongoing maintenance and run costs, the total cost of ownership behind it once it is live. We're appealing really to the technology vendors for the sense of utilizing technology for good. The bottom line is: How do we provide technologies better, faster and cheaper, so we can maintain a low-cost approach and deliver on every dollar given to us?

– *Interview by* Computerworld *contributing writer*
Mary K. Pratt *(marykpratt@verizon.net)*

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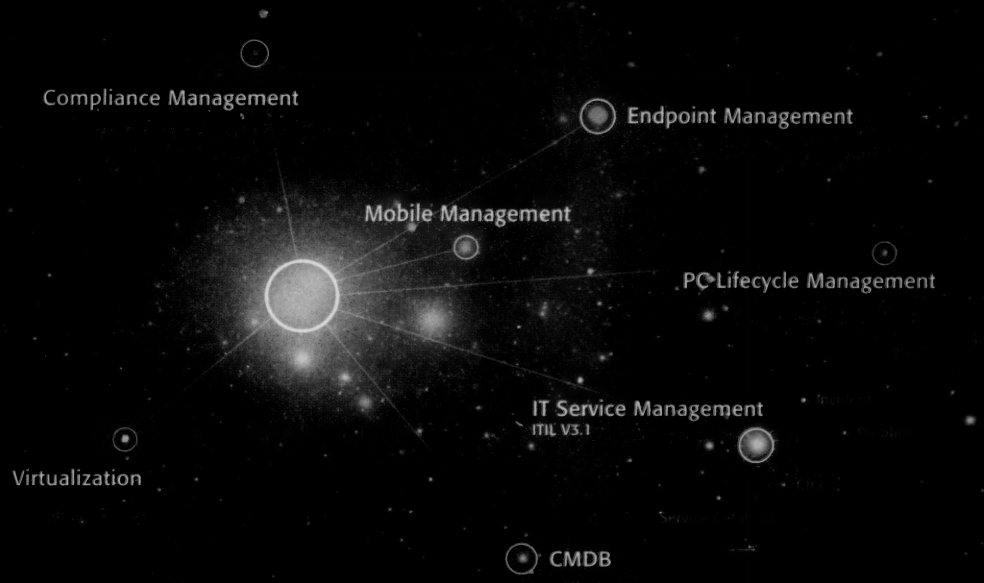

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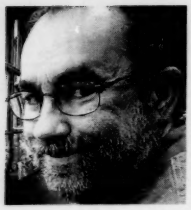

OPINION

S.J. VAUGHAN-NICHOLS

Metro on the Wrong Track For Many Windows Users

> Gaudy colors, boxy designs. Where have I seen this before? Wait, I know! Windows 1.0.

YOU KNOW ME. I'M A LINUX GUY. Still, I think Windows has gone from being a bad joke of a desktop operating system (Windows ME) to being a reasonable choice (Windows 7). Its course hasn't been steady, though: After the still popular XP SP3, we got Vista. And now we have Windows 8. What the heck is Steve Ballmer thinking?

Microsoft has made it clear that it considers Windows 8's Metro interface and applications to be the future. When I look at Metro, however, I see gaudy colors, boxy designs, applications that can either run as a small tile or as full screen with no way to resize or move windows. Where have I seen this before? Wait, I know! Windows 1.0.

Twenty-five years of user-interface development and *this* is what we get? Scary.

If Metro were just a tablet interface, I might be inclined to give it a pass — except that Android and iOS already have better, more usable interfaces. This isn't just my opinion. Look at the market: Windows Phone 7 has a Metro interface, and it has just a tiny fraction of the smartphone market.

Another problem is that longtime Windows users already know the Windows interface. They don't know Metro, which is *not* the Windows interface. Heck, Mac OS X Lion and Mint Linux's GNOME 2.28 both look and feel more like Windows 7 than Windows 8 Metro does. Fortunately, you can use a more Windows-like interface, but Microsoft really seems to want everyone to move to Metro.

Windows developers can't love this either. They've spent years learning the likes of .Net, Windows Communication Foundation (WCF) and Windows Presentation Foundation (WPF), and now they have to learn WinRT and Jupiter/XAML. As if that isn't bad enough, their workload has just doubled, since they'll need to rewrite their apps for the more traditional Windows-style desktop.

Think you can ignore Metro? Well, if you're writing or using only business programs, it might be possible. But if you're playing in the consumer space or planning on using tablets and smartphones, you're stuck with Metro. You see, Windows 8 will run only in Metro mode on ARM processors — which are the ones in your mobile hardware.

Let's get down to brass tacks. If you produce the operating system that much of the world runs, you'd better have a darn good reason for making a major change to your main user interface. There must be something about the interface that makes people go, "Wow." I don't see the wow.

Honestly, I don't see anything in Metro that's compelling. I just see a second-rate touch interface that's going to require every Windows user to learn a totally new, and not especially useful, way to do their daily work. What's the point?

Sure, Metro gives Windows 8 one interface on all platforms, but on the desktop, it's going to be a pain for both users and developers. It seems to me that with Metro, Microsoft is headed toward another Vista-size train wreck.

Strike that. Metro is worse than that. This may be the change that breaks Microsoft's stranglehold on the desktop. I can see a lot of people switching to Macs. I can see even more people taking one look at Metro and opting to stick with XP and Windows 7 for the foreseeable future. ◆

Steven J. Vaughan-Nichols has been writing about technology and the business of technology since CP/M-80 was cutting-edge and 300bps was a fast Internet connection — and we liked it! He can be reached at sjvn@vna1.com.

ALSO IN THIS ISSUE:
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Storage administrators list five ways that server virtualization complicates their lives — and reveal how they handle each headache.

BY STACY COLLETT

SERVER VIRTUALIZATION offers a host of efficiencies, but storage administrators say it may open a can of worms on the storage side. Resulting headaches can include huge I/O bottlenecks for primary and backup storage, as well as complicated disaster and recovery efforts, among other things.

With multicore CPUs being utilized to create multiple virtual machines on servers — and since the typical large-enterprise server farm is 70% to 80% virtualized — there's a lot more application I/O moving back and forth between application servers and primary storage, and between primary storage and backup storage.

Continued on page 20

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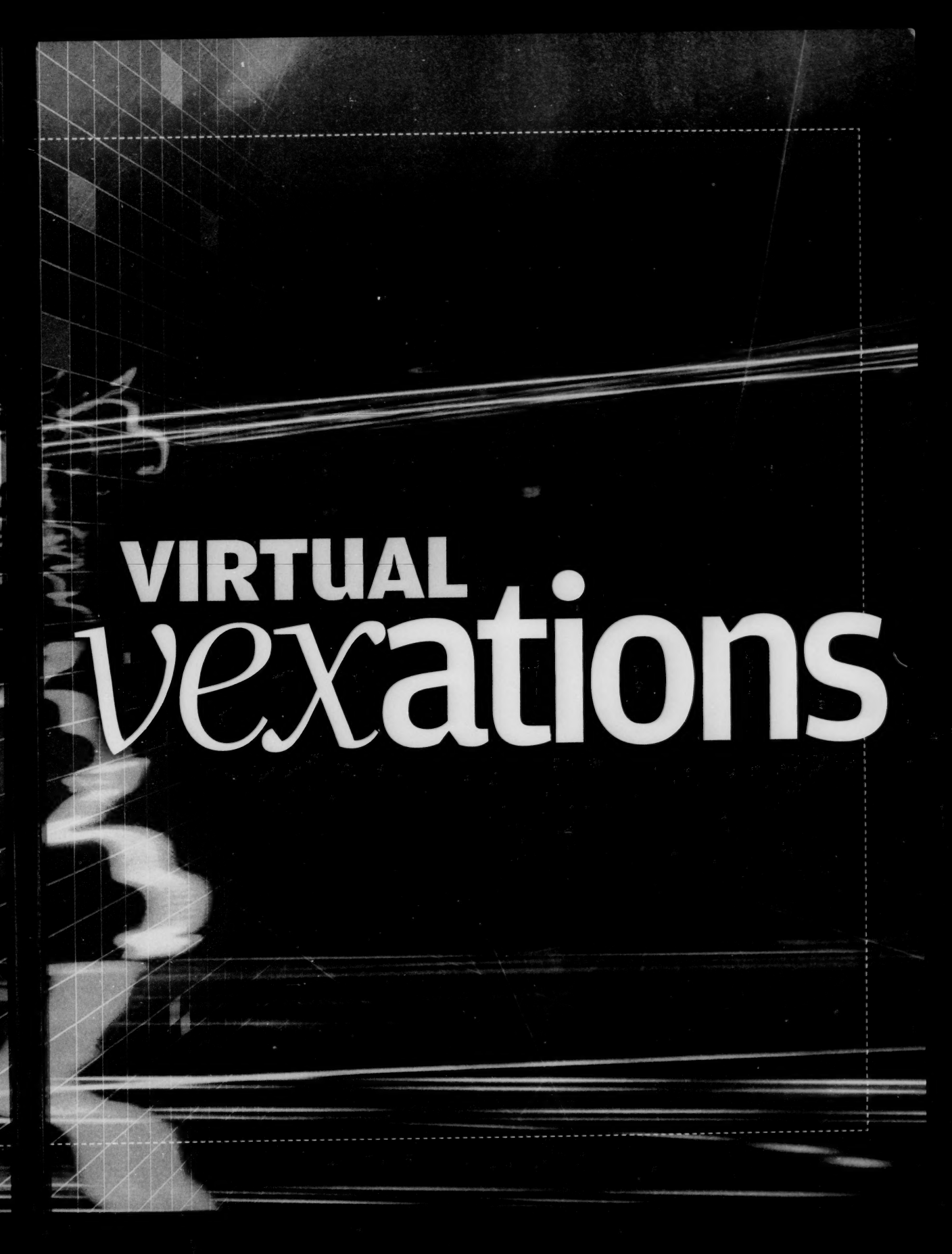
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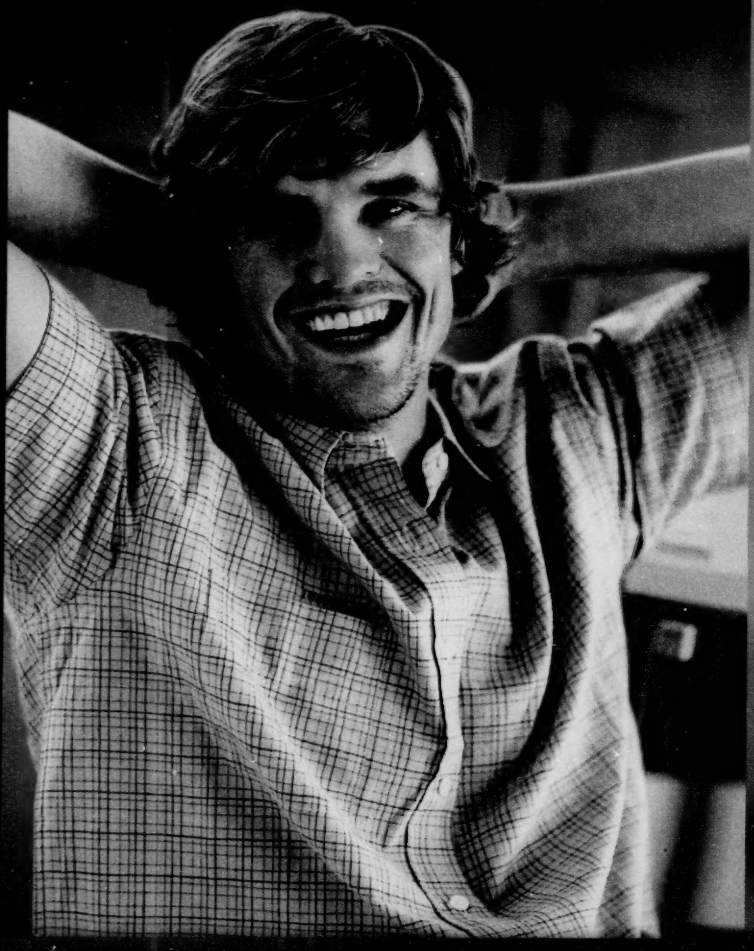

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Workload density has massively increased in the data center. Now you have 30 workloads in a single rack [running virtual servers].

JEFF BOLES, SENIOR ANALYST, TANEJA GOUP

Continued from page 16

What's more, between 2000 and 2010, the number of servers worldwide multiplied by a factor of six, while the amount of storage increased by a factor of 69, thanks to server virtualization, according to researchers at IBM.

In July, *Computerworld* polled dozens of storage administrators to find out how server virtualization has complicated their work lives. Our findings yielded this list of five top headaches. But fear not: IT analysts and virtualization veterans offer their advice on how to deal with each challenge.

1 Storage Performance Slowdowns and I/O Bottlenecks

IT administrators are painfully aware that storage performance is growing at a much slower rate than computing power. So when it comes to virtualization, it's no surprise that I/O bottlenecks and slow storage performance are the No. 1 problem for one-third of the administrators who responded to the *Computerworld* poll.

"Virtualization lets you do a whole lot of workloads on one physical piece of hardware, but there's lots of different I/O [operations] mixed into the I/O stream, so it makes disks work harder and caching less effective," says Jeff Boles, senior analyst at Taneja Group in Phoenix. "Virtualization lets us easily do more than our compute power is capable of."

HOW TO DEAL: The solution to the I/O bottleneck depends on where the problem lies: in the network or in the storage domain. Most often, it's in the storage environment, because improvements in storage capability have lagged behind that of all other infrastructure. "You have a very slow, creeping, linear progression of storage capability. Rotating disks can only go so fast. Part of the problem is visibility. Administrators can't see what's going on inside the storage environment, so they don't know how to fix it. Fortunately, we're getting some tools that can help you figure out that problem and address it [more easily]," Boles says.

Fibre Channel customers, for instance, might use Virtual Instruments' performance monitoring tool for storage area networks (SAN) to optimize performance and availability. Other storage vendors delivering visibility tools include NetApp, which recently acquired Akorri and its predictive tool for the virtual infrastructure, and EqualLogic, which has a graphical user interface that lets customers monitor storage system performance.

Boston-based ad agency Arnold Worldwide virtualized most of its servers five years ago. Chris Elam, senior systems engineer, remembers when he first started doing backups and noticed that throughput to the backups was dropping and that backup times were growing. But visibility tools on the firm's Dell Compellent SAN alerted Elam to the problem. He added more drives to increase I/O operations per second, and Compellent now spreads the data among the drives.

As an extra precaution, Arnold Worldwide's IT staff set most replications to take place during off-hours, except for those involving its production file servers, which it replicates during the day because data changes constantly. "That's an I/O hit we are willing to take," Elam says, adding that customer service is most important. "It's one thing if backups take longer; it's another thing if users start to complain [about slow systems]."

Performance is another important consideration in the I/O equation. "It's really important that administrators start to think about the I/O density and performance they need given the amount of infrastructure they have," Boles says. "Workload density has massively increased in the data center. Now you have 30 workloads in a single rack [running virtual servers]."

I/O density can be increased through the use of solid-state drives and similar technologies, more effective caching or autotiering. Also, I/O will only increase as the enterprise adds more servers within a single storage system. Scale-out technologies can help scale performance as well as capacity . "Small and medium-size business customers can look at [tools from] Scale Computing, for example. The midrange customer could look at EqualLogic, and the enterprise could look at NetApp and 3Par," Boles says.

2 More Complicated Data Backup and Disaster Recovery

More than a quarter (27%) of the respondents in the *Computerworld* poll said that server virtualization has complicated backup and disaster recovery.

One of the biggest mistakes here is trying to protect a virtual infrastructure with traditional backup methods, according to Boles. With traditional backup, "the degradation and backup performance is more than a linear degradation as you scale the number of virtual machines on a piece of hardware. You're effectively creating a blender for backup contention as you're trying to protect these virtual servers overnight. You try to do 10 backups simultaneously on this one physical server, and you've got a lot of combat going on inside that server for memory, CPU, network and storage," he says.

Complicating matters are workload mobility tools, such as VMware's Storage vMotion, that let users relocate virtual machine disk files between and across shared storage locations. "Now you have to keep a backup going in relation to these virtual servers that are going to be moving around, and possibly run into other bottlenecks. That can be a serious headache," says Boles.

HOW TO DEAL: A handful of vendors are building backup and recovery tools for the virtual environment that runs within their virtual infrastructure. That way, the vendors can capture

Continued on page 22

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The Desktop Dilemma

THE VIRTUAL DESKTOP I/O workload is tremendously punishing on a hard disk array. For starters, despite the traditional I/O workload of an individual workstation being sequential in nature, many IT departments are running thousands of virtual desktops on a single storage platform, which creates the I/O "blender effect."

"They're all doing sequential I/O in different regions of the disk, which turns those easy-to-service sequential I/O patterns into a nasty, random I/O pattern as far as the array is concerned," explains James Candelaria, CTO at WhipTail Technologies, a maker of solid-state storage arrays.

That's a big problem for traditional storage arrays because many don't have enough cache to keep up with the influx of data, and cache misses occur, slowing down the system.

HOW TO DEAL: First, perform an I/O profile analysis to make sure you know what the I/O demand is going to be. "A general rule of thumb is that to support a typical user on [a virtual desktop infrastructure] in a steady state environment, you need ... 20 to 40 I/O per second per user," Candelaria says. "If you don't account for that I/O demand, your user experience is going to suffer drastically."

Also, make sure you have a storage fabric and a transport fabric that's going to scale. "I see a lot of customers attempt to do virtual desktop projects without a high-speed storage fabric, and they're continually maxing out 1-gig storage links running on SCSI," he says. "You need to look at a higher-speed transport like 10 Gigabit iSCSI or Fibre Channel."

If you're going to deliver virtual desktops to remote users, make sure you have enough bandwidth to ensure a favorable user experience.

Finally, make sure you have a substantial amount of write I/O, Candelaria says. If designed correctly, the desktop workload is predominately write I/O as opposed to read I/O. Traditional vendors such as Citrix and VMware have come up with ways to mitigate read traffic from hitting the array, and they don't have to reach back to the array for data, reducing the amount of redundant traffic that it sees.

GETTY IMAGES / STEVE ALLEN

Continued from page 20

and manage data right on top of the physical server and optimize it before it ever leaves the virtual server.

Acronis, for example, recently announced a product that can back up virtual machines in a matter of minutes and recover the data in about the same amount of time, while keeping data organized as virtual servers move around. Many vendors have harnessed some virtualized infrastructure capabilities, such as storage snapshot tools and replication, to make backup simpler and faster than was possible in the past.

When the Bank of Fayetteville in Arkansas first started virtualizing its servers, Les Barnes, senior vice president and IT manager, treated backups the same way he would with traditional servers: He used a tape library. But after a few months, he knew there had to be a better way. What's more, backups were traditionally performed overnight, but as more customers demanded 24/7 access to the online banking system, Barnes needed another solution.

He completely eliminated traditional backups and replaced them with SAN replication and SAN snapshots as a way to make multiple copies of SANs off-site.

"The beauty of using SAN replication is that it completely offloads any I/O from the server," Barnes says. "It's now SAN-cluster-to-SAN-cluster communications. It's all backchannel stuff. There is no impact on the end user or the virtual machine. And if I have to recover, I can do it in a few minutes rather than a few hours or a couple of days."

Elam looks at Arnold Worldwide's SAN as a way to bring backups forward. "It's almost impossible now to just write everything to tape [over the weekend]," he says, adding that the ad agency holds 60 terabytes of data on its SAN. "But because we're replicating a lot of stuff off-site, that kind of serves as a backup. We also have snapshots that we keep live. We also do deduplication to get backups in a timely window."

But Elam warns that those snapshots can be quite large: "The biggest thing we didn't realize when we rolled this out was the amount of space that snapshots or replays take up. We didn't even think about how much it takes. You need to plan for that in the amount of data storage you have."

3 Difficulty Managing Shared Storage

Some 23% of the administrators we polled reported that server virtualization creates new headaches in managing shared storage.

Enterprises typically have a lot of different workloads being stored on storage systems, and for admin-

Continued on page 24

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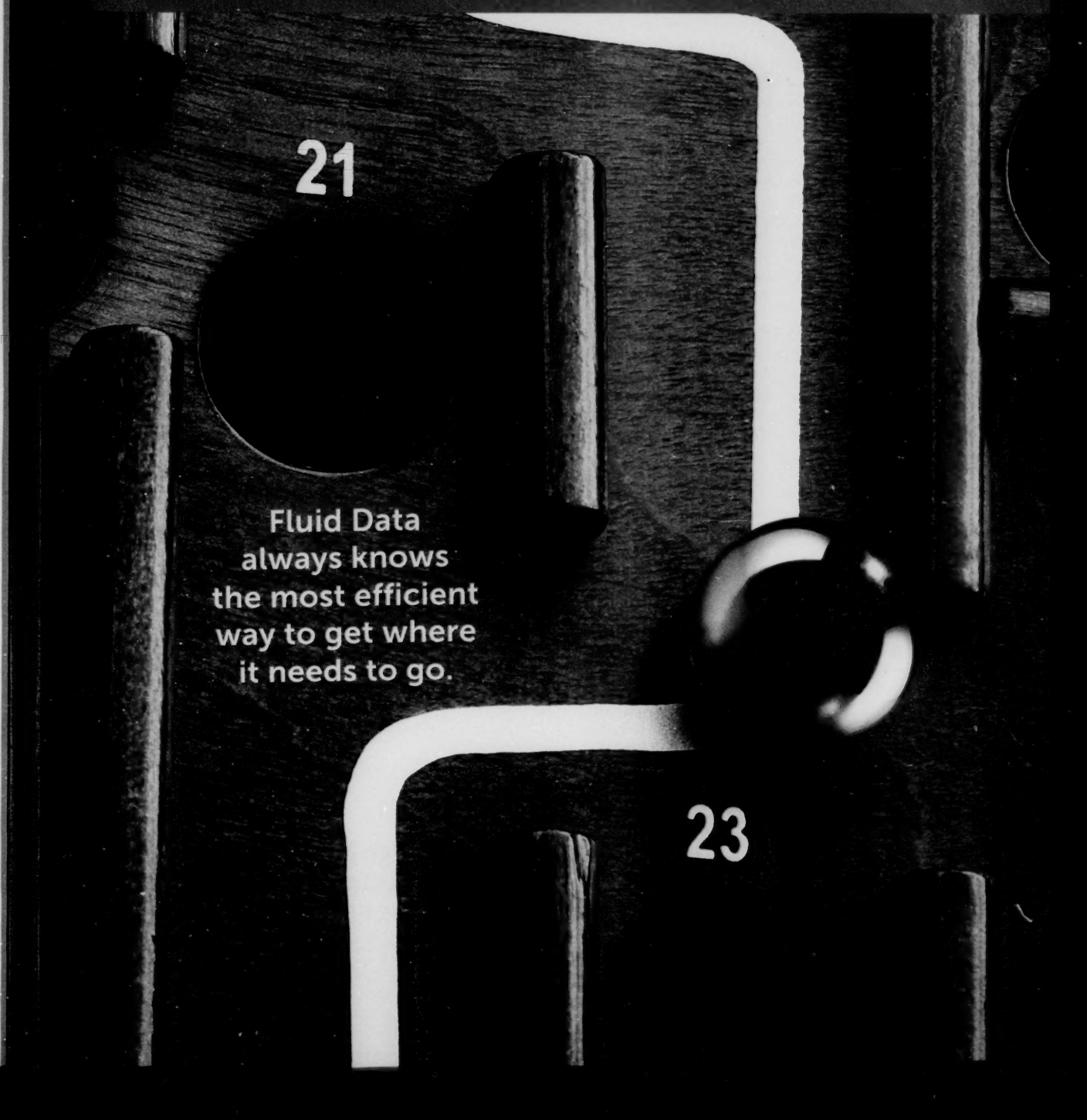

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istrators, there aren't always clear connections among the storage volumes, the workloads that each volume supports, the demands against each volume, and who is consuming capacity.

"Essentially, the virtual infrastructure has created another layer of abstraction on top of the storage infrastructure without really freeing you from the complexity of the physical layer," Boles explains. "Now you have this virtual storage layer that you're managing, made up of [VMware's] VMFS, all the different virtual server files and data, and you're provisioning those resources inside the virtual infrastructure — maybe even executing operations like Snapshot." On top of all that, "you still have to take care of the physical infrastructure and look at I/O demand. Having those two layers makes it harder to connect the dots between them," he says.

HOW TO DEAL: Consider thin provisioning, a storage virtualization capability that helps curb low storage utilization by allocating data to free space. Physical storage is allocated on demand from a shared pool, but only when needed.

By using thin provisioning along with server virtualization, users can optimize both server and storage utilization rates. Virtualization appliances and arrays from vendors such as 3Par, Compellent, DataCore Software and NetApp include thin provisioning functionality.

4 The Need to Adapt the Storage Infrastructure to Serve Both Physical and Virtual Environments

In a finding that's similar to the backup and recovery dilemma, 20% of the polled administrators said that they find it hard to adapt their storage infrastructure to handle a mix of traditional and virtual processes.

HOW TO DEAL: When jumping into virtualization solutions that will mingle with physical environments, "make sure you're doing it with the best storage vendor you can find for ease of use, simplicity and virtual infrastructure integration," Boles says.

Some of the big vendors' offerings are integrated with the virtual infrastructure, reducing the complexity of these systems "so you don't have to do a lot crazy stuff, like disk group configuration," he adds. "You want one-click setup of storage and [access to] fine-grain granularity provision storage so you can carve up resources, understanding who's using what, and manage it over time."

Some large-scale IT departments are even making a complete switch to technologies like an NFS-NAS setup, which is ready to go into production underneath a virtual infrastructure.

"You can store a whole bunch of virtual machines on one storage mount point and not have a lot of complexity around that," says Boles. "There aren't nearly as many headaches as trying to coordinate some of those physical storage resources with a very virtual server infrastructure."

5 Trouble Choosing the Right Kind of Networked Storage for Virtualized Servers

Some 18% of the storage professionals surveyed said that they can't decide on the right kind of networked storage for virtualized servers.

"The right kind of networked storage makes a difference — because you can scale, and get better performance and more simplicity in your processes [if you choose correctly]," Boles says. But the right solution depends largely on the organization's objectives.

At Purdue University's Krannert School of Management, for instance, the IT department's top priority wasn't 24/7 availability for its virtualized environment, but rather fast recovery time when — not *if* — the system went down, says IT manager Jeff Ellow.

Virtualizing storage-intensive servers without big performance losses requires a level of storage performance that SANs weren't able to achieve. The obvious choice for Purdue seemed to be 10 Gigabit iSCSI, but cost was a deterrent.

Purdue ultimately went with LSI 6Gbps SAS switching technologies, which offered the benefits of a failover SAN and the performance of an end-to-end native SAS 6Gbps data path —and which the school could afford.

"Even if our SAN goes down, we have enough local storage where we could limp along in another mode. Restoring more quickly is more important than staying up," Ellow says.

HOW TO DEAL: Before choosing any vendor, be sure you understand the management capabilities, Barnes says. Server and storage virtualization can be simple: "You don't have to be a rocket scientist or have a degree in SAN management to take care of these things," he says.

At the end of the day, Elam says the benefits of virtualization are worth the trouble of grappling with these five challenges.

"The pros far outweigh the cons just in its complete ease of use, stability, high availability, being able to replicate and do maintenance during the day, move stuff around as you need to and take hardware offline," he says "There are lots of things you don't have to come in on a weekend to do anymore." ◆

Collett *is a* Computerworld *contributing writer. You can contact her at stcollett@aol.com.*

Even if our SAN goes down, we have enough local storage where we could limp along in another mode. Restoring more quickly is more important than staying up.

JEFF ELLOW, IT MANAGER, KRANNERT SCHOOL OF MANAGEMENT, PURDUE UNIVERSITY

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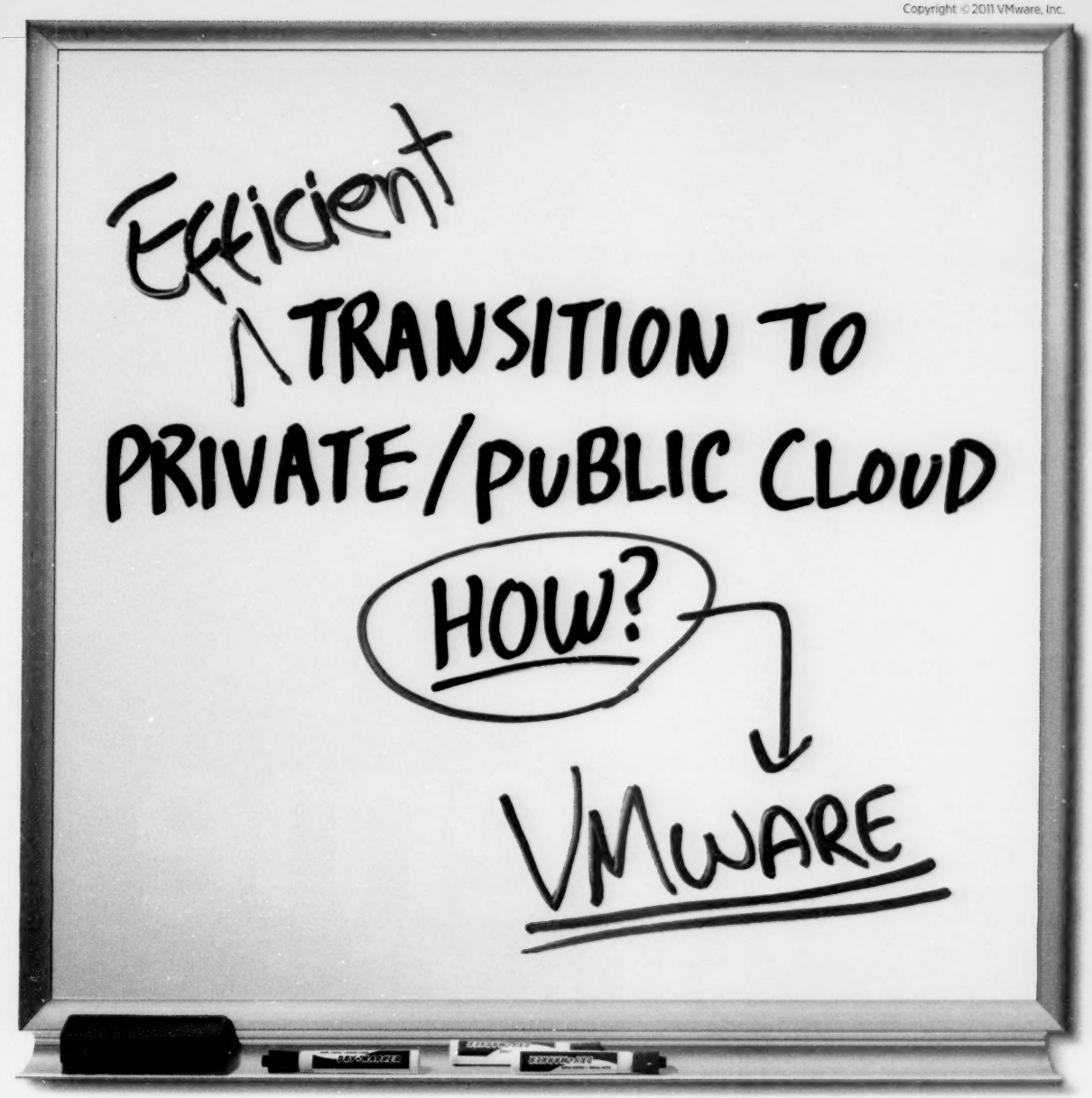

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How do you manage a vast data store? The Library of Congress and two other big storage users share some tips. BY JOHN BRANDON

IF YOU THINK the storage systems in your data center are out of control, imagine having 450 billion objects in your database or having to add 40 terabytes of data each week.

The challenges of managing massive amounts of data involve storing huge files, creating long-term archives and, of course, making the data accessible. While data management has always been a key function in IT, "the current frenzy has taken market activity to a whole new level," says Richard Winter, an analyst at WinterCorp Consulting Services, which analyzes big data trends.

New products appear regularly from established companies and startups alike. Whether it's Hadoop, MapReduce, NoSQL or one of several dozen data warehousing appliances, file systems and new architectures, the segment is booming, Winter says.

Some IT shops know all too well about the challenges inherent in managing big data. At the Library of Congress, Amazon

GETTY IMAGES / STEVEN PUETZER

and Mazda, the task requires innovative approaches for handling billions of objects and peta-scale storage mediums, tagging data for quick retrieval and rooting out errors.

1 Library of Congress

The Library of Congress processes 2.5 petabytes of data each year, which amounts to around 40TB each week. And Thomas Youkel, group chief of enterprise systems engineering at the library, estimates that the data load will quadruple in the next few years, thanks to the library's dual mandates to serve up data for historians and to preserve information in all its forms.

The library stores information on 15,000 to 18,000 spinning disks attached to 600 servers in two data centers. More than 90% of the data, or over 3PB, is stored on a fiber-attached SAN, and the rest is stored on network-attached storage drives.

The Library of Congress has an "interesting model" in that part of the information stored is metadata — or data about the data that's stored — while the other is the actual content, says Greg Schulz, an analyst at consulting firm StorageIO. Plenty of organizations use metadata, but what makes the library unique is the sheer size of its data store and the fact that it tags absolutely everything in its collection, including vintage audio recordings, videos, photos and other media, Schulz explains.

The actual content — which is seldom accessed — is ideally kept offline and on tape, Schulz says, with perhaps a thumbnail or low-resolution copy on disk.

Today, the library holds around 500 million objects per database, but Youkel expects that number to grow to as many as 5 billion. To prepare, Youkel's team has started rethinking the library's namespace system. "We're looking at new file systems that can handle that many objects," he says.

Gene Ruth, a storage analyst at Gartner, says that scaling up and out correctly is critical. When a data store grows beyond 10PB, the time and expense of backing up and otherwise handling that much data go quickly skyward. One approach, he says, is to have infrastructure in a primary location that handles most of the data and another facility for secondary, long-term archival storage.

2 Amazon.com

E-commerce giant Amazon.com is quickly becoming one of the largest holders of data in the world, with around 450 billion objects stored in its cloud for its customers' and its own storage needs. Alyssa Henry, vice president of storage services at Amazon Web Services, says that translates into about 1,500 objects for every person in the U.S. and one object for every star in the Milky Way galaxy.

Some of the objects in the database are fairly massive — up to 5TB each — and could be databases in their own right. Henry expects single-object size to get as high as 500TB by 2016. The secret to dealing with massive data, she says, is to split the objects into chunks, a process called parallelization.

In its S3 storage service, Amazon uses its own custom code to split files into 1,000MB pieces. This is a common practice, but what makes Amazon's approach unique is how the file-splitting process occurs in real time. "This always-available storage architecture is a contrast with some storage systems which move data between what are known as 'archived' and 'live' states, creating a potential delay for data retrieval," Henry explains.

Another problem in handling massive data is corrupt files. Most companies don't worry about the occasional corrupt file. Yet, when dealing with almost 450 billion objects, even low failure rates become challenging to manage.

Amazon's custom software analyzes every piece of data for bad memory allocations, calculates the checksums, and analyzes how fast an error can be repaired to deliver the throughput needed for cloud storage.

3 Mazda

Mazda Motor Corp., with 900 dealers and 800 employees in the U.S., manages around 90TB of data. Barry Blakeley, infrastructure architect at Mazda's North American operations, says business units and dealers are generating ever-increasing amounts of data analytics files, marketing materials, business intelligence databases, Microsoft SharePoint data and more. "We have virtualized everything, including storage," says Blakeley. The company uses tools from Compellent, now part of Dell, for storage virtualization and Dell PowerVault NX3100 as its SAN, along with VMware systems to host the virtual servers.

The key, says Blakeley, is to migrate "stale" data quickly onto tape. He says 80% of Mazda's stored data becomes stale within months, which means the blocks of data are not accessed at all. To accommodate these usage patterns, the virtual storage is set up in a tiered structure. Fast solid-state disks connected by Fibre Channel switches make up the first tier, which handles 20% of the company's data needs. The rest of the data is archived to slower disks running at 15,000 rpm on Fibre Channel in a second tier and to 7,200-rpm disks connected by serial-attached SCSI in a third tier.

Blakeley says Mazda is putting less and less data on tape — about 17TB today — as it continues to virtualize storage.

Overall, the company is moving to a "business continuance model" as opposed to a pure disaster recovery model, he explains. Instead of having backup and offsite storage that would be available to retrieve and restore data in a disaster recovery scenario, "we will instead replicate both live and backed-up data to a colocation facility." In this scenario, Tier 1 applications will be brought online almost immediately in the event of a primary site failure. Other tiers will be restored from backup data that has been replicated to the colocation facility.

Adapting the Techniques

These organizations are a proving ground for handling a tremendous amount of data. StorageIO's Schulz says other companies can mimic some of their processes, including running checksums against files, monitoring disk failures by using an alert system for IT staff, incorporating metadata and using replication to make sure data is always available. However, the critical decision about massive data is to choose the technology that matches the needs of the organization, not the system that is cheapest or just happens to be popular at the moment, he says.

In the end, the biggest lesson may be that while big data poses many challenges, there are also many avenues to success. ◆

Brandon *is a former IT manager at a Fortune 100 company who now writes about technology. Follow him on Twitter (@jmbrandonbb).*

LISTENING TO THE VOICE OF THE CUSTOMER

It's time to gather **customer feedback** in one place so you can take action.

BY ELISABETH HORWITT

ABOUT 20 MONTHS AGO, Charming Shoppes launched a customer insights project to "deliver actionable customer and market research and analysis to the business," says Jeffrey Liss, who headed up the initiative. Liss is now

Continued on page 30

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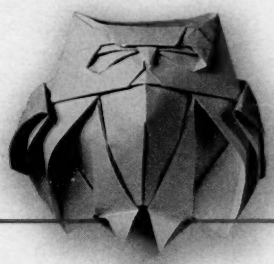
"THE WISE MAN SOLVES 1,000 PROBLEMS WITH A SINGLE SOLUTION."



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Add Customer Voices to CRM

ABOUT 90% of software vendor Clarabridge's customers have chosen its SaaS offering, according to CEO Sid Banerjee.

This is not surprising, given the costs and headaches of deploying and maintaining a VOC infrastructure in-house. Companies need a data warehouse for customer information, says James Kobielus, an analyst at Forrester Research. "Think of Twitter streaming in all the time," he says. "Even if you filter for a subset relating to the demographic you're tracking or your own customer base, it quickly becomes too much."

Another challenge is integrating VOC tools and platforms with existing CRM and BI systems. "You want to pass feedback data and alerts into your CRM application so when you call up a customer record, you see not only what they just bought, but how they rated their last interaction," says Bruce Temkin, a managing partner at Temkin Group.

Conversely, CRM systems can help VOC systems prioritize surveys and responses from customers based on which respondents are not prospects or big buyers. Most VOC vendors offer their own proprietary dashboards and querying tools, and they're starting to link up with leading CRM and BI systems. BI and CRM vendors should enter the VOC market this year, according to Forrester.

But even with a hosted VOC platform, designing and deploying the infrastructure is far from simple, early implementers agree.

"The big challenge is integrating unstructured VOC data with structured databases, in particular CRM data," says Jeffrey Liss, senior vice president at Charming Shoppes. "Our CRM group is working toward that goal."

Continued from page 28

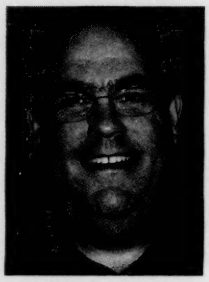
senior vice president of corporate strategy at the plus-size women's clothing retailer, which includes Lane Bryant, Fashion Bug and Catherines stores.

Before that time, the company's method of collecting and disseminating customer feedback was less than organized, Liss recalls. Various departments and brand groups gathered input from customer emails and online product reviews, while store personnel received verbal comments from shoppers. Anything deemed relevant was "passed up the command chain" to top executives via email distribution lists, Liss says. As a result, "we had a lot of anecdotal information floating around," and executives had no way to distinguish important data from rumor, he says.

After a considerable amount of research and thought, Liss came up with a "voice of the customer" (VOC) strategy to collect both quantitative and qualitative input from various customer feedback channels; analyze it for sentiment, meaning and importance; and then forward relevant data to the right people for further analysis and action.

This sort of organized approach is becoming even more critical as the company adds new feedback channels, such as an online survey tool that will ultimately deliver approximately 10,000 customer comments per week, according to Liss.

When it comes to interpreting such comments, "sentiment analysis is key," he notes. For example, "if a customer says, 'I really love going to Fashion Bug, but I don't like sorting through all of the jeans to find the ones that fit me well,' you need to parse the statement using sentiment analysis to understand that she is a big fan of Fashion Bug, but we may have a customer service issue to address," he explains.



» "It takes time to learn how to harness the power of [a VOC] tool," says Jeffrey Liss, a senior vice president at Charming Shoppes.

In December 2010, Charming Shoppes signed up for the software-as-a-service (SaaS) version of a VOC system from Reston, Va.-based vendor Clarabridge. Deployment of the system, Clarabridge Enterprise, is very much in the early stages, says Liss, pointing out that "it takes time to learn how to harness the power of this tool."

While plenty of companies are launching VOC programs, most are just getting started. Last year, a survey by Temkin Group found that of 105 companies with formal VOC programs, 63% were still "figuring out what to collect, and how," says Bruce Temkin, a managing partner at the Waban, Mass.-based research firm.

But a Forrester Research survey conducted late last year shows some momentum behind VOC programs. Of the 118 customer experience professionals Forrester surveyed, 52% had a VOC program in place and 29% were actively considering one. "Big companies have finally embraced the link between customer experience, loyalty and long-term financial success," says Forrester analyst Andrew McInnes. "Investing in voice-of-the-customer programs is the next logical step."

Indeed, businesses are recognizing the value of customer input for a growing number of strategic areas, including marketing, product development and quality assurance. Moreover, VOC systems can also be used to collect comments and criticisms from industry pundits and the general public.

VOC Gets Social

Another driver for VOC programs is the social Web's growing clout as a consumer sounding board. In a first-quarter 2011 consumer survey by Temkin Group, about 20% of the respondents said that they had used Facebook to report a bad experience, while 13% said that they had used it to report a good experience. Moreover, 11% had reported a bad experience on third-party review sites like Yelp and TripAdvisor, and 7% had used such sites to report good experiences.

Still, many business leaders remain wary of data garnered from social media, which can be less than accurate or reliable, to say the least. Temkin Group's third-quarter 2010 survey found that only 22% of VOC programs were currently using

Continued on page 32

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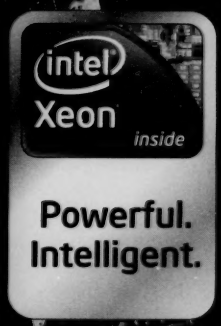

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Continued from page 30

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Such services can cast as wide or as fine a net as customers want; they also offer some degree of quality control. Dow Jones Insight, for example, "selects social media based on how influential it is, how frequently it was updated in the last 90 days, and whether it is free from spam and porn," says Martin Murtland, managing director for the service. It can also add targeted sources at a customer's request, such as Twitter feeds focused on specific subjects, he notes.

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The problem is that such deployments tend to create information silos that are isolated from IT staff and systems. As a result, there's little sharing of insights among groups. VOC programs need to integrate all of the various feedback channels into a single infrastructure, Temkin points out. And that's where IT comes in.

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For example, analysis revealed that guests who had a good check-in experience were less likely to complain about other things, while those who had a bad check-in experience tended to look for further faults.

Gaylord employees also found that the percentage of customers satisfied with the check-in process plunged from 79% when it took less than five minutes to 50% if it lasted five to 10 minutes, and down from there the longer the check-in experience was.

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Security Manager's Journal

MATHIAS THURMAN

Getting the Most Out of SIEM

The CIO isn't convinced about the value of investing in a security incident and event management tool.

THE CIO continues to question the value of our $250,000 investment in a security incident and event management (SIEM) tool. I want more money in the budget next year to expand SIEM deployment to other areas of the world, and he wants to know what he'll get for that money.

My usual response is that we can better detect malicious activity in the network thanks to the sophisticated correlation rules we can build. But that isn't enough for the CIO, so I've had to think outside of the box.

One idea came to me during a meeting with our enterprise audit and risk director, who mentioned that one of his responsibilities is to audit the financial system. That comment led me to create a rule that keeps track of who logs in to the financial system and what logs are generated when a financial transaction, such as cutting a check or processing a payment for electronic funds transfer, is executed. The rule states that anytime a check is cut to the person who is logged in, or to any existing employee, an alert should be triggered. Another new rule leads to alerts when certain people access the system an unusual number of times per day.

I also turned my attention to domain administrator accounts. Holders of those accounts can, for example, view our CIO's email, calendar and contacts, or look into anyone's file share, PC or Microsoft SharePoint document library. When I first arrived at this company, domain accounts were handed out like lollipops. For example, if you were assigned to the help desk, you automatically got one. You're a new IT manager? Here's a domain account for you. Welcome to the company! I have since put the kibosh on that practice and have implemented requirements for domain account creation, which include my approval.

Those measures have helped to decrease domain accounts by 60%. But from time to time, accounts still get created without my approval. I therefore created a rule in our SIEM tool to capture the event ID and data generated when a domain account is created, and to trigger an alert. If I see that there's no approval, then I escalate.

... the discussions about security! **computerworld.com/blogs/security**

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Trouble Ticket

» The CIO wants to know the ROI on SIEM before acquiescing to expanding the deployment.

» Find new ways to derive value from SIEM, including in the financial system and the DMZ, one of the CIO's pet concerns.

I also saw an opportunity to use the SIEM tool in my efforts to better control resource placement in the DMZ, which refers to the part of our network that faces the Internet. As I've explained before, resources in the DMZ are in the crosshairs of hackers and other malicious types. Though I have been cracking down and rooting out resources that unnecessarily leave us vulnerable, it hasn't been easy to intercept every rogue machine that's placed into one of our many DMZs.

SIEM Eyes the DMZ

The fact that our CIO is highly concerned about the DMZ issue makes the use of SIEM in DMZ monitoring very attractive. So I wrote a rule to detect when a new IP address has been added to the DMZ networks by correlating data with our Nessus scans. If a resource is added without change control or architecture review, then I escalate.

My new rules have given me a more solid answer for the next time the CIO asks me about the return on investment that we're getting from the SIEM deployment. Besides the standard response that we've prevented sensitive data from leaving the company via command-and-control back channels, I can say that we prevented 10 unauthorized servers from being added to his DMZs and prevented four unnecessary users from being able to read his email.

There's no data from the financial system so far, but when there is, I think the CIO will leave me alone. ◆

This week's journal is written by a real security manager, ***"Mathias Thurman,"*** *whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com.*

PRESTON GRALLA

The Enterprise Is Unlikely to Jump on Microsoft's Metro

> Enterprises are going to be hard-pressed to see improvements. They might skip the upgrade entirely.

MICROSOFT RECENTLY released a Developer Preview of Windows 8, which Steven Sinofsky, president of Microsoft's Windows division, called a "bold re-imagination." For once, corporate hype is accurate; this new version of Windows is dramatically different from Windows 7, Vista and XP. Not that *different* always means better. Enterprises are going to be especially hard-pressed to see improvements in Windows 8. In fact, they might skip the upgrade entirely.

To understand why, let's take a brief look at the upcoming operating system. Windows 8 introduces an interface, which it calls Metro, that's completely different from anything ever seen in Windows before. (Steven J. Vaughan-Nichols has more to say about Metro on page 14.) Based on the Windows Phone 7 tiled interface, Metro is clearly designed for tablets. When you boot Windows 8, you're dropped straight into the Metro interface, which is made up of many large, brightly colored tiles. The tiles can display changing information such as stock prices or social network updates — whatever you prefer.

The tiles run full-screen, just like tablet or smartphone apps. They lack the usual Windows menus and controls and can't be resized. They're simple to use and clearly designed for consumers.

So where's the familiar Windows desktop? It's just another app. Click the Desktop tile, and you're sent into what looks very much like the familiar Windows 7 desktop, with the usual clickable icons for running apps, a taskbar with thumbnails and so on. There are some changes — the Start menu has been ditched in favor of a Start button that brings you back to the Metro interface — but in general, what you'll see there will be very familiar.

For enterprises, though, Metro is a problem. Upgrading to Windows 8 could require a significant amount of time to retrain people on how to use their computers. It could mean a lot of reprogramming. It could put a burden on help desk personnel. In short, it could be a migration nightmare.

And to what end? Metro doesn't seem to have any clear benefits for corporations. Michael Cherry, an analyst at Directions on Microsoft, told *Computerworld* that Microsoft hasn't "made the case yet that enterprises will want this."

One possibility is that Microsoft will allow enterprises or hardware makers to turn off Metro, or at least relegate it to the background and have users boot directly into the old, familiar Windows desktop. But in that case, what would enterprises get out of Windows 8? In the Developer Preview, at least, there's nothing new in the desktop and thus no reason for enterprises to upgrade.

It may well be that Microsoft is purposely ignoring enterprises with the release of Windows 8. Gartner analyst Michael Silver says that "Microsoft has implied that [Windows 8] would not drive an upgrade cycle. After all the work on Windows 7 deployment, organizations [are] looking for a little respite and [are] planning to take a break because of migration fatigue."

If that's the case, then Microsoft took this opportunity to design a consumer-centric operating system that's optimized for tablets — an area where the company needs to play catch-up — not for enterprises, where it remains strong and where migration fatigue may have set in.

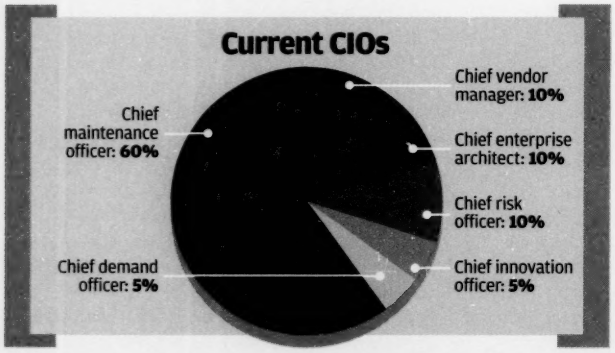
So don't expect to see Windows 8 on your enterprise desktop. For a new version of Windows, you may have to wait for Windows 9. ◆

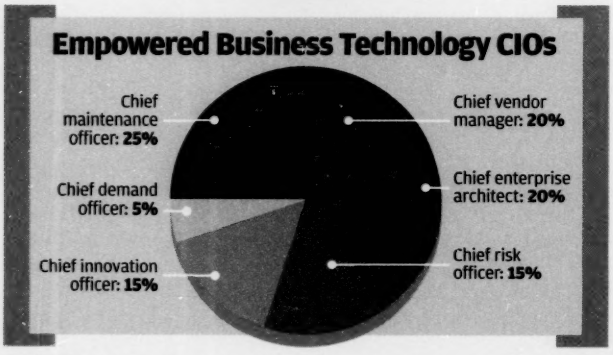
Preston Gralla is a *Computerworld.com* contributing editor and the author of more than 35 books, including *How the Internet Works* (Que, 2006).

Career Watch

What Does an **EBT CIO** Do?

Forrester Research figures that CIOs currently spend 60% of their time as "chief maintenance officers" – that is, they have to devote several hours a day to making sure that all the IT infrastructure and applications are running smoothly. **But Forrester envisions a shift to an era of what it calls empowered business technology (EBT), in which business units are more involved in deciding what their technology needs are and how to achieve them.** This transition would greatly reduce the number of hours that CIOs spend as chief maintenance officers and allow them to devote a good deal more time and energy to managing things like risk, vendors and innovation. **Here's the breakdown of current and just-beyond-the-horizon CIO duties, as Forrester sees it:**




Empowered Business Technology CIOs
Chief maintenance officer: 25%
Chief vendor manager: 20%
Chief demand officer: 5%
Chief enterprise architect: 20%
Chief innovation officer: 15%
Chief risk officer: 15%

SOURCE: FORRESTER RESEARCH, JULY 2011

Q&A

Anjul Bhambhri

IBM's *vice president of* **Big Data Products** *explains the role of data scientists.*

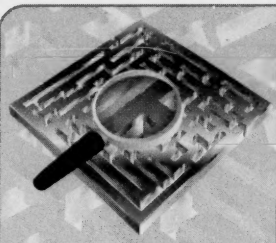
What is a data scientist? A data scientist is someone who analyzes an organization's big data to discover actionable trends that lead to business results. Data scientists look at what questions business people need to ask to remain competitive. They work directly with C-level executives, advising them on how to drive maximum value from big data and integrate new information. In many ways, a data scientist serves as a change agent in today's workforce, pushing organizational collaboration and information integration.

What sort of background and skills are best to bring to this position? Successful data scientists can handle information complexity, influence both the business and IT organizations, and pursue their own research. They provide the most value when they are learning what the data is telling rather than spending time working on the functional aspects of data management. Therefore, deep knowledge on how to mine the data or use predictive analytics is less important than experience in applying the right questions with the technology tools. Companies will miss out on excellent candidates if they use a traditional checklist focusing on data skills.

People interested in the role should have some background in math, modeling and analysis, with possible professional work in machine learning, data mining or predictive analytics. Candidates should be able to work across the organization and influence various disciplines. And once in the role, the data scientist must continue professional education, pursuing things like IBM's free boot camps on improving data management and strategy skills.

Is there much demand for this role right now? A Google search will find over 10,000 postings for data scientists. That's an impressive number for a nascent field. Businesses are starting to understand the need for data-driven insights. i find myself frequently explaining the position to prospective and current clients. Specifically, I discuss how the role works, the appropriate academic and professional background of a good candidate, and how to integrate the position into your existing organization.

Another indicator of the demand for data scientists is the number of conferences focused on this role. In May 2011, the first annual Data Scientist Summit was held, and in August 2011, the Joint Statistical Meeting was held, with significant attendance by practitioners and companies hoping to find good candidates. Stanford University has estimated that 1,200 exabytes of data were created in 2010. That's a tenfold increase in five years, and it shows that there is a real demand for this role.



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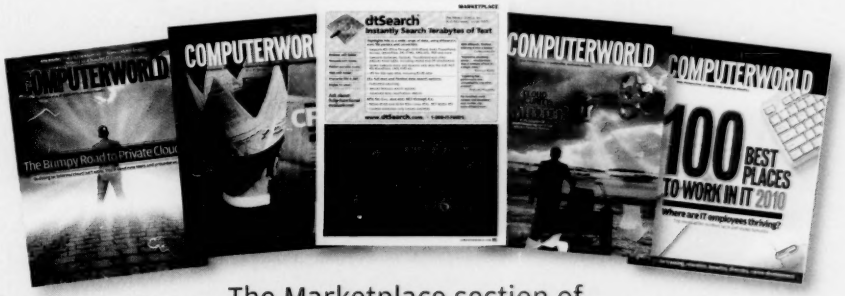

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Source: *Harvey Ad Measurement Study, Computerworld May 10, 2010

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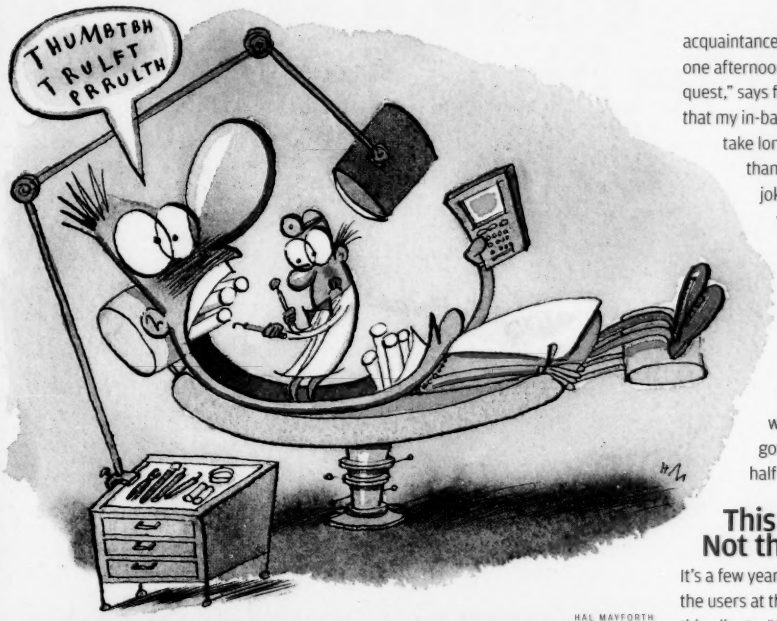

HAL MAYFORTH

Wasso Hargagout At?

Net admin pilot fish's company is in the middle of switching to a new phone carrier – a project that has seen one delay after another. But the new carrier is quick to respond to problems, thanks in part to a system that automatically transcribes fish's voicemails to the customer-service rep to emails. But then comes the weekend when a cracked tooth sends fish on an emergency trip to the dentist – and while he's in the chair, his phone starts to vibrate. It's half an hour before he's able to check messages, at which point he learns that the old carrier has disconnected an office by mistake. He calls the new carrier and leaves a message. When there's no response, he calls again and again for the next half-hour. What's going on? "I drove back to the office and emailed the customer-service rep," fish says. "She was right on the ball and solved the problem. Why was she so slow in responding before? She was unaware of the problem because her emails were gibberish. Apparently the voicemail-to-email transcription system fails to understand post-dentist English."

If You Have to Ask Who, the Bribe Didn't Work

This pilot fish is working in the small database group of a big corporation, and his boss is on vacation for two weeks – which means he can pretty much make his own rules so long as everything gets done. "An engineer acquaintance stopped by my cube one afternoon with a simple request," says fish. "I told him truthfully that my in-basket was so full, it would take longer to get to his task than to actually do it. Then, jokingly, I added, 'But if you bribe me with donuts, I'll move your job to the top of the pile.' The next morning, I found a half-dozen donuts on my desk. I didn't have to ask who they were from. The engineer got his results in less than half an hour."

This Time It's Not the User

It's a few years back, and most of the users at this company have thin clients. "At that time, if a user's printer ran out of paper, the thin client would freeze until paper was put in the printer," says an IT pilot fish on the scene. "One user would call me a couple times a week and tell me her computer was frozen. I would ask her if there was paper in the printer and the answer was always no. One day she called and said her printer wasn't working. I asked about the paper and she responded, 'Yes, I checked that first.' I walked down to her desk and started troubleshooting. I quickly noticed that her printer was missing its power cord. I asked what was going on, and her manager said, 'I got tired of her calling you about her printer not working because it was out of paper. I removed her power cord.'"

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1&1 Internet	18-19, 21
Brocade	C4
CDW	C3
CenturyLink	9
Comcast	5
CommVault	29
Dell	23
dtSearch	37
Hewlett-Packard	7, 31
IBM Non-Intel	C2
Microsoft	11
Numera Software	13
Samsung	15
SonicWALL	3
VMWare	25

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PAUL GLEN

When Techies Speak, The Devil's in the Details

For techies, details reveal truth, but for nontechies, details cloud truth.

EVERY IT PROFESSIONAL HAS BEEN HERE: A business person asks you a question, and your thorough answer just isn't good enough. You try to give more specific information in an attempt to break through the communication barrier. But the more you try, the worse things seem to get. In the end, the business person is seething with impatience, so you start to get confused and angry.

Both parties walk away from such encounters convinced that it's hopeless to communicate with "those types" of people. They both say of the other, "They don't get it." And as a result, the business people stop asking questions, and we, the IT people, are relieved.

I'd grown so accustomed to this type of disconnect that I had come to see it as a natural part of working in organizations. But a recent interaction made me realize that it is one facet of a deep divide between business and IT, and that understanding the root of the disconnect is crucial to resolving it.

I was talking to a smart and articulate business person. Our conversation was following the seemingly inevitable course toward disconnect until we took a step back and examined what was at the heart of our conflict. The conclusion we came to was fascinating: It wasn't the language that was dividing us; it was the fact that technical and nontechnical people have completely different perceptions of what constitutes a good answer.

The frustration that these conversations normally produce arises from our completely different understandings of what is true in the world — as well as our incompatible ways of thinking about truth, identifying it, defining it and feeling it.

The business person had asked me a simple question about a project we were working on, and I had responded with an itemized list of the six key elements that related to the question. As I introduced each item, she became increasingly agitated. I had seen this reaction many times before, but it had never made any sense to me. After all, I was doing a great job of explaining things; my list was quite complete.

Because, for me, a technical person, *details reveal truth*. Broad, sweeping statements are vague and untrustworthy, nothing more than assertions. They need to be deconstructed, clarified, qualified or proved before I believe that they embody any form of truth. Analysis is my chosen method for discovering truth. Big things are broken down into manageable components that are then examined individually. If the parts cohere, then the whole makes sense.

But for her, a nontechnical person, *details cloud truth*. Broad statements give her a handle on what's at stake, so she can test the truth of an idea against her internal sense of what's what. Essentially, she wants to "feel" the truth. Too many details interfere with her ability to process the explanation, thus preventing her from "getting it."

In my answer, I focused on completeness. That's my form of truth. To her, it felt like I was being evasive, and that I was overly concerned about trivial matters and unaware of what was important. If I had offered a high-level answer that focused on one or two key ideas, she would have been much more receptive. She explained that she would have eventually been interested in the details, but only after she had gotten the gist.

So, think twice before you assume that a more detailed explanation is a more credible one. You might be talking to someone with a very different experience of what it means to "get it." ◆

Paul Glen is the CEO of Leading Geeks, an education and consulting firm devoted to unlocking the value of technical people. You can contact him at info@leadinggeeks.com.

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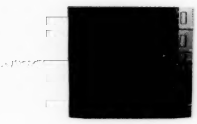

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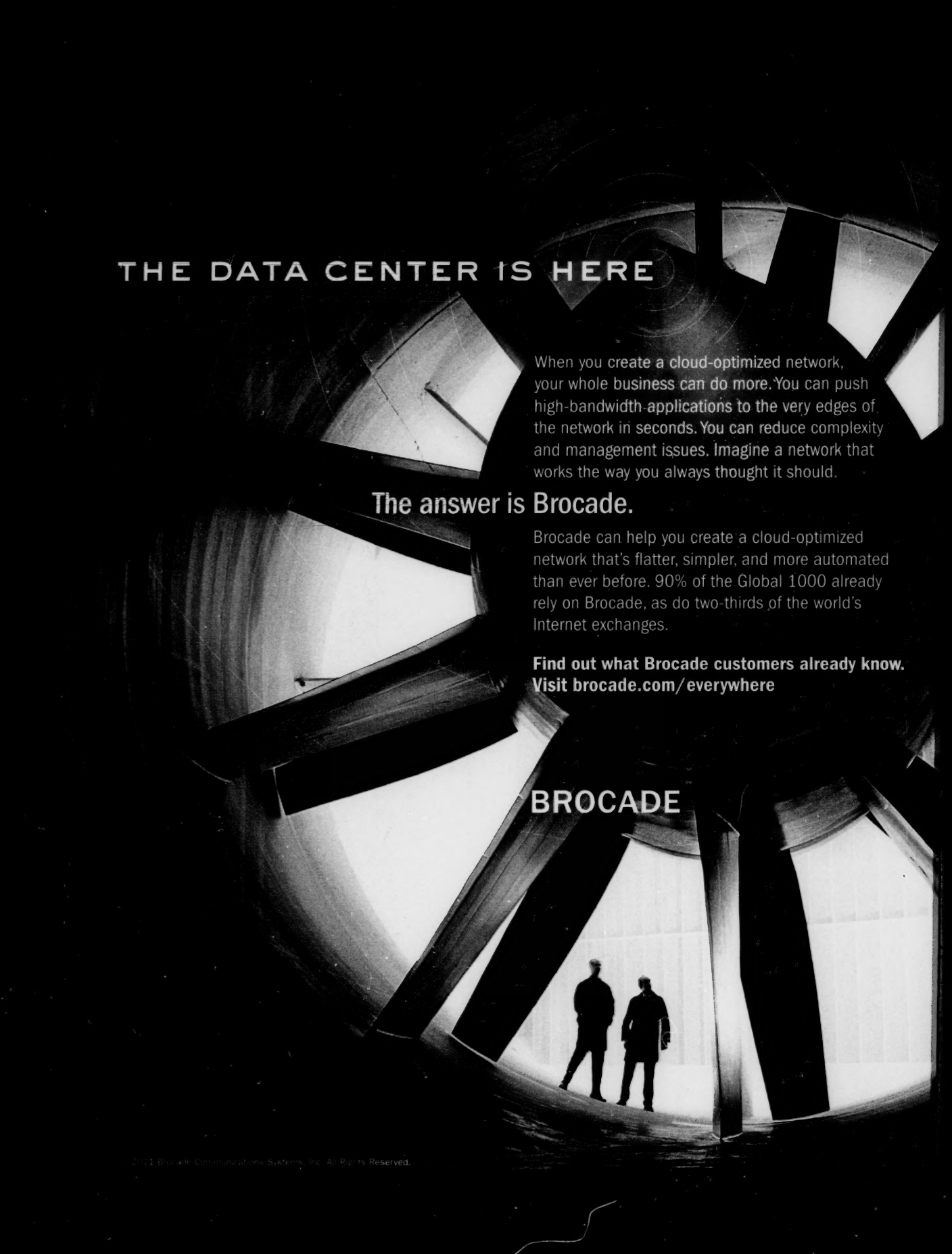
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